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ABSTRACT

A comprehensive community environmental inventory is an ongoing process of investigation and study to compile and evaluate information about the natural and man-made environmental features and characteristics of an area, as well as related social, political, and economic information. Such information is important to the community in developmental planning and in preventing and resolving environmental problems and it is important in serving as a local basis for an environmental education emphasis in the school. Section I includes a general overview of the uses and procedures involved in a community environmental inventory. Section II outlines the importance of natural environmental features and characteristics as a basis for the assessment of natural areas and their importance to one another. Section III identifies human environmental use areas and characteristics. Section IV provides guidelines and information for evaluating the natural ecological effects of human environmental use and the degree to which these areas meet human needs; and guidelines for identifying, interpreting, and evaluating ecological values of land, air, water, plants, and animals. The related social, political, and economic aspects of the community are considered in Section V. Section VI provides sources for inventory information. (TK)

U.S. DEPARTMENT OF HEALTH
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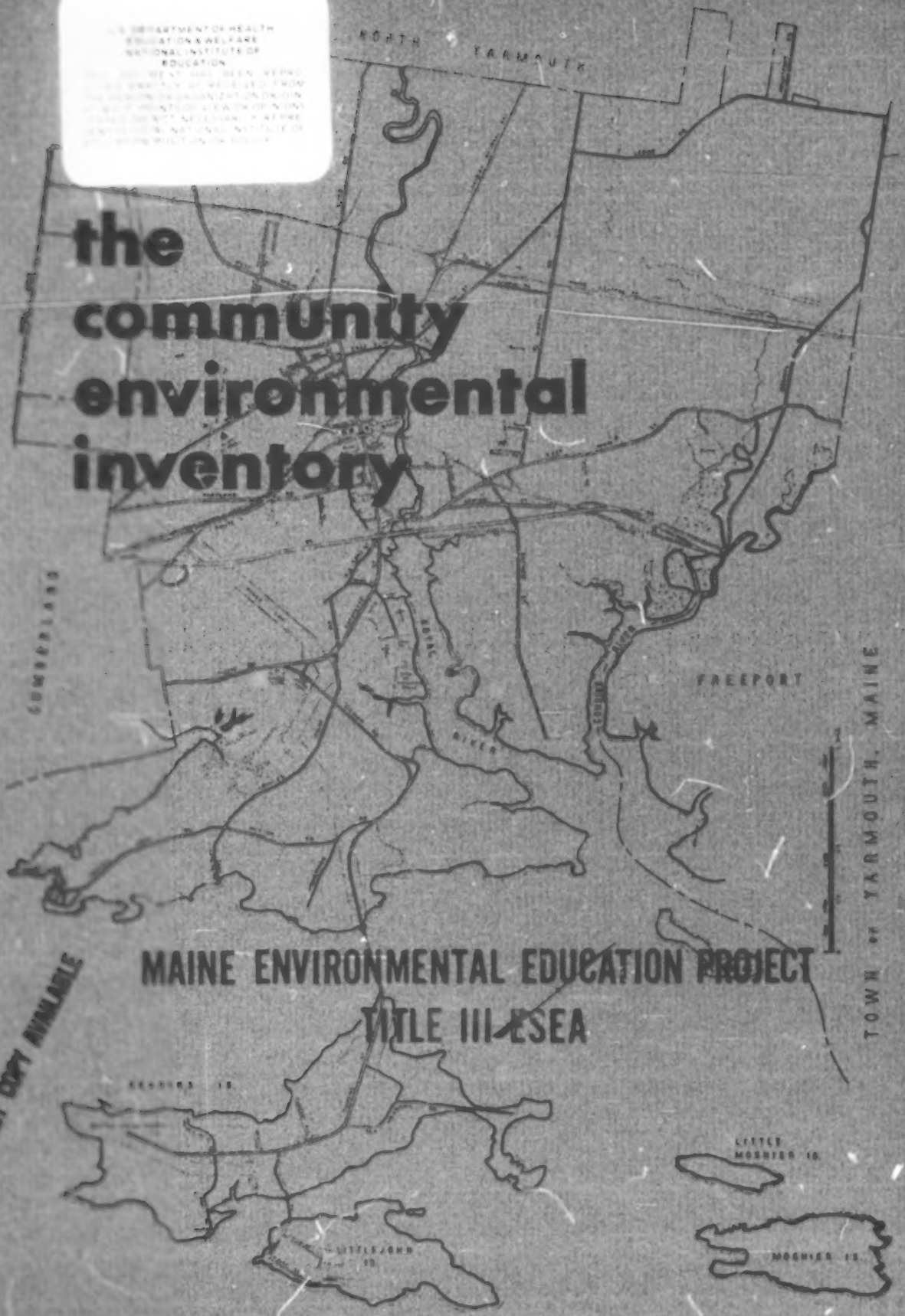
the community environmental inventory



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GUIDELINES FOR PLANNING AND IMPLEMENTING

A COMPREHENSIVE

COMMUNITY ENVIRONMENTAL INVENTORY

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1971

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Yarmouth, Maine

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GUIDELINES FOR A COMPREHENSIVE COMMUNITY ENVIRONMENTAL INVENTORY

Introduction

Description of the Inventory -

A comprehensive community environmental inventory is an ongoing process of investigation and study to compile and evaluate information about the natural and man-made environmental features and characteristics of an area as well as related social, political and economic information. An inventory then brings data together into one comprehensive and accessible reference on the community environment. It also involves evaluation of the information collected for the purpose of developing a broad understanding of the community and its problems. It should be noted that, while this booklet discusses inventory at the community level, the material presented also applies equally well to a region - one encompassing several communities, such as a school administrative district.

Use in Community Planning -

A community inventory is useful in two major and related ways. First, it provides information useful to the community in planning its development and in seeking to prevent and resolve environmental problems, such as incompatible land use and loss of open space. In this respect local agencies, including planning boards and conservation commissions, as well as private organizations and individual citizens will find the inventory process a learning experience which provides for the identification of environmental management and policy-making needs.

Use in Environmental Education -

Secondly, a community inventory provides a basis for an environmental education emphasis in the school tailored to the local community. Environmental education is defined as a process aimed at producing a citizenry that is knowledgeable concerning the total environment and the role of man, able to participate in activities for maintaining and improving the quality of the environment while meeting human needs, and motivated to do so.

Teachers and students will find these guidelines useful for:

1. Suggesting topics which may be investigated and methods of compiling data.

2. Providing ideas for the evaluation of collected information and the identification of environmental improvement opportunities and problem-solving activities such as:

   a. Park planting and beautification

   b. Trail development for recreational vehicles

   c. Improvement and maintenance of signs

d. Solid waste management projects

e. Supporting the passage and implementation of necessary ordinances

3. Identifying social, political, and economic factors necessary to recog.izing opportunities for environmental improvement - prevention and resolution of problems and alteration of the environment to enhance its function and quality.

These kinds of activities as suggested by the guidelines may provide a basis and a direction for courses of study, teaching units, and a variety of independent and group learning activities.

Carrying Out the Inventory -

The responsibility for planning and implementing a comprehensive community inventory can be initiated by a group of people representing a wide range of interests in the community such as a conservation commission, if one exists. An effective way is through a local environmental education committee made up of community citizens from both public and private sectors, school administrative personnel and teachers, and youth. (See The Environmental Education Committee, Maine Environmental Education Project, Title III, ESEA, Yarmouth, Maine.)

Making the Results Available -

As information is gathered and processed, it should be placed in a resource manual with clear references to the location of original resources, such as maps and charts, which will not fit into the manual. Copies should be made available to both school and community people. It is important to recognize that an inventory is never really completed since the community is continually changing and the assessment of environmental problems requires continuous monitoring.

OUTLINE OF A COMPREHENSIVE COMMUNITY ENVIRONMENTAL INVENTORY

The outline which follows is a listing of elements in a comprehensive community inventory. First, it is important to recognize at the outset that the task of gathering and evaluating data about all the inventory components listed is a long-term continuing project. It provides opportunities for many people to participate including elementary and secondary students. Secondly, it is not expected, nor would it be practical, that all those items in the outline be inventoried immediately and completely. Instead, data about some elements would undoubtedly be more valuable if collected first.

Section I includes general introductory items which give an overview of the community. Section II outlines natural environmental features and characteristics. Information of this kind provides an ecological basis for making judgements about the environmental effects of human activities. The list of human environmental use areas and characteristics in Section III is a reflection of these activities. Most community environmental problems will relate to one or more of these natural and man-made features. Techniques for detecting and evaluating possible problem areas are suggested in Section IV. Section V contains data useful in understanding human demands upon the environment and the causes, effects, and solutions to problems.

I. INTRODUCTION

Introduction to the inventory
- Need for the inventory
- Purpose of the inventory

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Introduction to the community
- General written description including:
  - Location
    - Geographic--longitude, latitude, elevation
    - Relationship to unique natural and man-made features
  - Size and shape
    - Size in acres and/or square miles
    - Size in population
    - Shape and boundary description
  - Principal economic activity
  - Other pertinent introductory information
    - Includes important social, cultural, and historic notes

General graphic description including:
- Drawings
- Maps
  - Location in state and region
  - Descriptive of community

Photographs
Aerial
Surface

Note: It is suggested that base maps and photos have a scale of 4" = 1 mile. This is a common and convenient scale for most inventory purposes. For purposes of compilation the original maps may be reduced and printed in booklet size. In addition, it is suggested that the locations of original maps be referenced in the inventory booklet.

II. NATURAL ENVIRONMENTAL FEATURES AND CHARACTERISTICS

The following components of a community's natural environment are an important part of an inventory. The inventory is concerned with assessing these components both from quantitative and qualitative points of view. It is important to note, for example, such quantitative factors as extent, size, depth, density, and so on depending upon the components being inventoried. It is also equally important to qualitatively assess these components by comparing them with standards of known or established value, or by comparing them with similar components in other natural areas. This, in effect, provides a means of assessing natural areas based upon their relative ecological importance to each other. Once the qualitative data has been obtained, the components or natural areas containing those components may be rated according to their relative importance. They may also be evaluated to identify existing or potential environmental problems associated with them. Section IV of this outline gives guidelines and provides information for carrying out such an evaluation.

LAND

Land is valuable ecologically because it provides not only a place for plants and animals to live but matter which they can utilize as food.

Topography

Written description:

- Topographic features in relation to surrounding area, e.g., foothills area, coastal plain, etc.
- Specific characteristics and unique topographic features, e.g., ridges, deep valleys, etc.

Graphic description:

- Topographic map (and profile maps)

Geology

Written description:

- Geologic history
- Rocks, minerals, and glacial features
- Bedrock strength and stability

Graphic description:

- Map of bedrock geology and characteristics
- Map of significant outcrop areas and other unique features - caves, faults, etc.

Soils

Written description:

- Soil kinds or phases
  - Physical, chemical, biological characteristics
  - Locations

Graphic description:

- Map of soil types
- Map of suitability ratings

WATER

Water is valuable ecologically as a medium in which plants and animals can live. It provides matter which must be available for organisms if they are to survive and contribute to the stability of the natural environment.

Ground Water and Associated Features

Aquifers

Aquifers are water bearing strata of porous material.

Aquifer Recharge Areas

Aquifer recharge areas are zones where water percolates into the ground eventually making its way to the aquifer or ground water supply which it feeds.

Written description:
Nature, size, and location of aquifer or ground water sources and recharge areas

Graphic description:
Map of known aquifer or ground water sources and recharge areas showing size and location.

Surface Water and Associated Features

Ocean (Offshore Zone) and Related Coastal Features

Ocean

The ocean here refers to the open sea commencing at the line of the lowest tide.

Estuaries

Estuaries are bodies of water where fresh water from streams and rivers joins the salt water of the sea. They are bordered by and partly separated from the ocean by land not originated from the sea, for example, a spit or offshore bar.

Tidal Marshes and Flats (Saltwater Wetlands)

Tidal marshes consist of distinctive plant associations on tidal lands near features such as estuaries, spits, offshore bars, and islands. Beginning as mud or sand flats colonized by algae, they range through several zones of vegetation to the "highlands" at the edge of the sea.

Beach and Dune Areas

Beaches and sand dunes result from sand deposited in areas along the seashore by wind and water.

Rocky Seashore Areas

The rocky shore includes the area from the point of highest storm tide to the point of lowest tide and is characterized predominantly by rocks, ledges, and associated vegetation.

Written description:

Description of major characteristics: physical - size, location, depth, turbidity, etc., chemical - pH, dissolved oxygen, etc. and biological - species diversity, etc.

Graphic description:

Map illustrating relative sizes and locations of the above areas. Profile maps illustrating the general ecological character - topography, diversity, layering, etc.

Streams, Rivers, and Floodplains

Streams and rivers are flowing waters which form surface drainage patterns on the landscape. The floodplain is land which is submerged by floodwaters during periods of rapid run-off.

Written description:

General description of major river basin(s) in the region

Description of the general character of the drainage patterns in the community including brief descriptions of the major physical, chemical, and biological characteristics of the rivers and streams

Graphic description:

Map of the river and stream basins and drainage patterns including floodplains, graphs and river and stream profile maps showing seasonal average flows, dissolved oxygen (D.O.), vertical drop, and other physical, chemical, and biological characteristics

Lakes and Ponds

Lakes and ponds are areas of standing water varying in size from less than one acre to bodies containing many square miles. Also included are temporary ponds which dry up in the summer months.

Written description:

Number and description of general physical, chemical, and biological characteristics of lakes and ponds in the area being inventoried including classification in eutrophic or oligotropic terms.

Graphic description:

Map of the location, size, shape, and depth of lakes and ponds (also temporary ponds) and indicating bottom vegetation--submergents and emergents--as well as surrounding zones of vegetation.

Profile graphs showing physical, chemical, and biological characteristics

Bogs, Marshes, and Swamps (Freshwater Wetlands)

Bogs, marshes, and swamps represent stages in lake succession as they fill in and eventually become land areas. Bogs are characterized by blocked drainage conditions, presence of peat, semifloating mats of vegetation, and acid conditions. Marshes are wetlands in which the dominant vegetation is grasses, sedges, and reeds. Swamps are wooded wetlands of a later successional stage.

Written description:

Identification and general description of the physical, chemical, and biological characteristics of bogs, marshes, and swamps.

Graphic description:

Map of the location, size, and shape of wetland areas, profiles of ecological characteristics.

ATMOSPHERE AND CLIMATE

The atmosphere provides elements for life, carrys water, supports combustion, and transmits sound. The term climate refers to the average, most frequent atmospheric conditions, characteristics, and probable variations. The ecology and the development of a given area are affected in a major way by climatic conditions. It is important then for these reasons that the following conditions and their graphic variations be inventoried.

Temperature

Written description:

General description of temperature throughout the year including average dates of first frost in the fall and last in the spring and prevalence of temperature inversions.

Graphic description:

Table of monthly and annual temperature averages

Map of areas of frost susceptibility with high to low values of frequency

Map of areas of temperature inversion with high to low values of frequency

Air Movement

Written description:

General description of air movement patterns and storm systems related to elevation, topography, and precipitation throughout the year.

Graphic description:

Map showing general air shed and storm system movement patterns during different seasons of the year including rain-shadow and snow-belt areas

Precipitation

Written description:

General description of precipitation in the area throughout the year including snowfall volumes and average annual fog days

Graphic description:

Table of monthly and annual precipitation averages

Table of monthly and annual snowfall volumes

Map of areas susceptible to fog by average annual fog days with high to low values shown

Air Quality

Written description:

General description of ambient air quality variations in the area including levels of the following contaminants: suspended particulates, sulfur dioxide (SO_2), carbon monoxide (CO), photochemical oxidants as (O_3), hydrocarbons (HC), and nitrogen dioxide (NO).

Graphic description:

Map variations in levels of air contaminants at selected locations in the area.

PLANT AND ANIMAL ASSOCIATIONS (Natural Habitats)

Plant and animal populations interact and are dependent upon each other and the non-living environment. Plants are primary producers, able to capture the sun's energy and manufacture food upon which all organisms depend. Animals are consumer organisms and in association with plants form highly interdependent food chains and webs. Some plants and animals, acting as decomposers and transformers of materials, put substances back into the system which can be reused by the primary producers. Plant and animal populations together with the non-living components of the environment comprise ecological systems. Within these ecosystems occur the constant cycling processes involving energy flow, production, consumption, and decomposition. Changes which affect the basic cycling mechanisms, such as the removal of a species, may have disasterous ecological consequences on other parts of the system.

Ecosystems may be thought of as groupings of different plant and animal associations which function within two major categories of habitats - terrestrial (land) and aquatic (water). The degree of stability and productivity of the natural environment is related to the variety or diversity of habitats within these two categories. An inventory of habitat diversity can help a community to be aware of the extent that natural areas have been or are being threatened by man-made developments. Although the ecological value of some habitats is well documented (e.g. the salt marsh is an extremely important area in providing nutrients and shelter for a great many kinds of organisms), much remains to be learned about others. Inventorying habitat diversity may give, at best, only a rough indication of natural environmental quality. Nevertheless, just as the loss of a single species can affect a small-scale system, the continuous loss of natural habitats to man-made developments has a cumulative effect upon the whole natural ecosystem. The fact that we do not know what all of these effects are should be an additional deterrent against the widespread destruction of natural areas.

Terrestrial Habitats

- Natural meadows and clearings
- Fields
  - Active
  - Abandoned
- Brush and shrubland
- Forests and woodlands
  - Immature hardwoods, softwoods, mixed
  - Mature hardwoods, softwoods, mixed
- Orchards
  - Active
  - Abandoned
- Plantations (planted woodland areas having one or two predominant species)
- Transitional habitats
  - Floodplains
  - Dunes
  - Upper beaches

Aquatic Habitats

Saltwater
- Intertidal areas
  - Sand beaches
  - Rocky beaches
  - Tidal flats
- Shallow subtidal areas
  - Bays and inlets
  - Shoals and reefs

Brackish water
- Coastal marshes
- Estuaries

Fresh water
- Springs
- Brooks and streams
- Rivers
- Swales and marshes
- Bogs
- Swamps
- Ponds
- Lakes

Written description:
General description of habitat areas including the dominant plant species and predicted wildlife species; location and extent of areas; estimate of kind and number of major species present; unique areas or specimens; observed or known condition of species (prevalence of disease, wind damage, effects of water quality, etc.)

Graphic description:
Maps and/or aerial photos showing habitat areas, locations, shapes, dominant plant species, predicted wildlife species, unique areas and specimens.

III. HUMAN ENVIRONMENTAL USE AREAS AND CHARACTERISTICS

The following components of a community's man-made environment are a part of an inventory. An inventory is concerned with determining the existence and location of areas of human use and development and their characteristics. Section IV gives guidelines and information for evaluating their natural ecological effects and the degree to which they meet human needs.

For each of the features listed below, the inventory should contain the following information:

Written description:

- Description of the environmental use area or development and its characteristics
- History of development and resource use related to the area
- Current development and management practices
- Future needs and plans for development

Graphic description:

- Map of the existing man-made features showing size, shape, and location as well as new development possibilities to meet future needs.

HUMAN ENVIRONMENTAL USE AREAS

Production Areas

- Aquaculture and commercial fisheries areas
- Agricultural areas
  - Row crops
  - Grain crops
  - Hay crops
  - Grazing
  - Orchards
  - Other
- Forest commercial productivity areas
- Oil and natural gas withdrawal areas
- Mineral mining areas
  - Sand and gravel
  - Granite
  - Metals
  - Other
- Energy production areas
  - Hydroelectric power production
  - Steam power production - specify type
  - Other

Human Settlement Areas

- Commercial areas
- Institutional areas
  - Schools

- Churches
- Government facilities
- Other

Residential areas
- Single dwelling units
- Multiple dwelling units
- Mobile-home parks
- Other

Historic areas and structures

Open Space Areas (Terrestrial and Aquatic)

Buffer areas
Scenic areas
- Vistas

Educational and scientific study areas
Other

Transportation-Circulation Areas

Streets and highways
Parking areas
Airports
Railways
Ports, harbors, waterways
Pathways
Other

Recreational Areas

Playgrounds
Organized sports areas
Picnic areas
Camping areas
Park areas
- Urban
- Rural

Natural interpretive areas
Water related recreational areas
- Boating and sailing
- Canoeing
- Fishing
- Swimming
- Marinas
- Landings
- Others

Hunting areas
Golf areas
Mineral collecting areas
Other

Community Service and Utility Areas

Power transmission ways
Street lighting zones

Gas supply ways
Public water supply areas
    Groundwater supply sources
    Reservoirs and impoundments
    Treatment and distribution areas
Sewage treatment areas
    Public sewage treatment
    Private sewage treatment (septic tank, etc.)
Storm drain areas
Sound level areas
Solid waste disposal areas
    Public
    Private
Fire control areas
    Hydrant and water supply zones
    Fire station proximity zones
Pest and disease control zones (rodents, etc.)
Urban tree maintenance areas
Other

IV. ENVIRONMENTAL EVALUATION AND INTERPRETATION

The purpose of this section is to give information and suggested guidelines for identifying, interpreting, and evaluating: 1. ecological values of land, water, air, plants, and animals, 2. possible environmental problem areas resulting from current and projected human demands made upon the environment, and 3. the degree to which man-made components or environmental uses and alterations meet human needs.

EVALUATION OF THE NATURAL ENVIRONMENT

The first approach to determining the value or quality of natural areas is based upon the extent to which the structure, characteristics, interrelationships, and changes of the environmental components within those areas contribute to their overall environmental health and stability. Topography, geology, soil depth and fertility, soil uniformity, susceptibility to erosion, characteristics of ground and surface water, air movement and weather, and diversity of plants and animals are among the many components which contribute to differing natural conditions between areas. Examination of these components and their associated conditions through the inventory process begins to reveal that there are differences in value between natural areas. For example, natural conditions in some areas provide better wildlife habitats, such as for deer, than do other areas; some trout streams are better than others; some sites grow better forest stands than others; and some areas are valuable because they contain rare or unique resources, such as minerals, wildlife species, or even scenic views. Thus it is possible to rate natural areas in relation to each other as being high, medium, or low value areas on such a basis.

It is helpful to map these areas according to their values by assigning colors or shaded tones to represent the value ratings. If these are done on transparencies using colors or shades which will transmit light, the process may be carried a step further. By superimposing these transparent overlay maps, the composite value of several individual component values may be determined. This, in effect, visually portrays the sum of all the individual values within these areas.

A second approach to evaluation of natural environmental areas is based upon the quality changes brought about by the effects of existing or proposed man-made developments. This may be accomplished by superimposing transparent overlay maps of current or projected human activity areas over base maps of natural areas which have been previously evaluated by the method described above. Thus it becomes possible to interpret or predict changes in natural value as a result of such developments. Slope, for example, is an important consideration in the development of human activities since it is related to soil erosion susceptibility. Superimposing existing or projected land development activities over slope ratings of natural areas can point

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out those areas incompatible with such development and/or the need for precautionary measures such as soil erosion and sedimentation controls. Similarly, an overlay map of existing or proposed residential areas may be placed over a base map of soil suitability ratings such as for structural foundation support or for septic tank sewage disposal in order to determine where such development may be incompatible with natural conditions.

It should be recognized that such evaluation and interpretation techniques within the inventory process can be used to provide the means for ranking natural land areas in their order of ecological and social importance. The values derived can contribute to better land use planning as we begin to consider the natural and social values of our environment along with the economic values of human endeavor.

To assist in carrying out these two kinds of evaluation, each of the natural components listed in the next few pages may be treated in the following manner:

1. Describe (and assign value ratings to) the component (or area) in relation to its ecological significance, i.e., its structure, characteristics, interrelationships, and changes with other components;

2. Compare existing or proposed human developments to the rated ecological values of the components or areas. This can serve to identify existing or potential environmental problems as well as pointing out those areas which will be enhanced by such development.

LAND

Topography

Topography, particularly slope, is an indicator of the land's ussceptibility to erosion. Erosion results in the displacement and possible loss of matter for plants. This in turn may result in lack of species diversity, inefficient use of the sun's energy and instability of the natural environment. These kinds of ecological problems might arise from a lack of adequate erosion prevention controls when agricultural and forestry practices, for example, are being carried on.

On a coded map using colors or light to dark tones designate slope areas listed below. These in turn are related to erosion susceptibility:

Low to flat:	0-8% level to gently sloping (8% = 8' rise in 100' distance)
Moderate:	8-15% moderately sloping
Steep:	15-35%+ strongly sloping to steep

Superimpose overlays of selected existing and projected man-made features or developments over slope map to indicate existing or potential problem areas.

Geology

The character of the bedrock affects, among other things, its compressive strength for foundations and its stability or susceptibility to movement. Associated problems may arise from uses incompatible with these factors.

If engineering information is available, rate and map bedrock foundation areas using a high, medium, and low classification scale.

Superimpose overlay maps of selected man-made features over a foundation suitability map.

Soils

Ecologically, soils provide matter for living organisms to survive. Soil has many factors which may be assessed and valued - fertility, depth of top soil, drainage, etc. Associated problems arise when incompatible human development occurs without safeguards.

The Soil Conservation Service is in the process of completing a detailed soil inventory of Maine. For many areas this kind of information is available. Following such an inventory the SCS rates the suitability of the different soils for approximately thirty-three different human uses. These ratings provide guidelines for evaluating existing and projected man-made environmental alterations.

WATER

Ground Water and Associated Features

Problems related to groundwater usually involve contamination and depletion. Contamination may occur from a variety of conditions including dumps, road salt, septic tank wastes, etc., located within aquifer recharge areas. Depletion may occur from heavy withdrawal or practices affecting recharge areas including stream diversion, paving, etc.

Rate groundwater supplies according to amount and quality of water available if such information exists.

Superimpose overlay maps of human activities affecting groundwater supplies to indicate possible areas of excessive demand or sources of contamination.

Surface Water and Associated Features

Ocean and Related Coastal Features

Ecological problems related to the ocean and coastal areas involve contamination of the water and destruction of plant and animal life. Natural forces such as storms and siltation may cause problems as well as human activities. The latter include draining, filling, and waste disposal.

Rate features on such characteristics as contamination and uniqueness

Superimpose overlay maps of human activities affecting the ocean and related features to indicate possible areas for environmental improvement or protection

Streams, Rivers, and Floodplains

Most rivers and streams have been affected by man's activities resulting in silt, sewage, and industrial waste pollutants. The latter includes acids, toxic chemicals, high temperature water, detergents and radioactive wastes. The kind and quantity of such pollutants and where and when they are introduced determine the severity of resulting ecological effects. Other human activities have caused fluctuations in stream flows. These include heavy withdrawals of water and improper forest harvesting practices. Related to problems of rivers and streams are river floodplain developments. Often rich, nutrient laden floodplain areas have been taken out of agricultural production and developed as residential, industrial, and commercial areas. Such areas are extremely vulnerable to floodstage conditions.

Rate features according to such characteristics as seasonal fluctuations in stream flow, flood susceptibility, and water quality (dissolved oxygen - D.O., Coliform count, biochemical oxygen demand - B.O.D., etc.)

Superimpose overlay map of human activities placing demands on rivers, streams, and floodplains.

Prepare river and stream profile maps showing water quantity and quality characteristics. Compare with graphs illustrating effects of human demands.

Lakes and Ponds

Ecological problems of lakes and ponds result from fluctuating water levels, siltation, and the introduction of wastes from human activities and other sources.

Rate lakes and ponds on such characteristics as water quality, successional stage, etc.

Superimpose overlay maps of development activities and environmental uses having possible effects on lakes and ponds.

Bogs, Marshes, and Swamps

Ecologically, wetlands are valuable areas providing water control and having a great diversity of plant and animal species. They are, however, often drained and filled for human uses which may result in water table changes, altered drainage patterns and habitat destruction.

Rate wetlands on a scale of high, medium, and low values according to identified characteristics such as drainage control and species diversity.

Superimpose overlay maps of development activities having possible detrimental effects on wetlands.

ATMOSPHERE AND CLIMATE

Temperature, Air Movement, Precipitation, Air Quality

Many environmental problems are associated with the atmosphere and climate. Extremes in weather can have disastrous effects - floods, storm damage to vegetation and man-made structures, wildlife destruction, and so on. So also can the quality of the atmosphere - air pollution - have detrimental effects.

Rate areas according to frost susceptibility (base upon dates and frequencies), temperature inversion (base upon number and length of time), susceptibility to storms, susceptibility to fog, severity of air pollution, and air movement patterns.

Superimpose overlay maps of human development activities affected by or affecting atmospheric conditions.

PLANT AND ANIMAL ASSOCIATIONS (Natural Habitats)

Factors which affect the quality of natural habitats to support plant and animal species include natural factors such as storms, insect infestations, overbrowsing, etc., and human activities which may result in contamination and habitat alterations.

Rate habitat quality (high, medium, low) according to the extent to which natural and human factors have affected the habitats.

Superimpose overlay maps of natural influences and human developments to identify the sources of existing and potential related environmental problems.

EVALUATION OF THE MAN-MADE ENVIRONMENT: ENVIRONMENTAL DESIGN

In this part guidelines are given for assessing the degree to which the human use areas or features outlined in Section III meet man's physical, psychological, and social needs. These areas include:

Production Areas
Human Settlement Areas
Open Space Areas
Transportation-Circulation Areas
Recreational Areas
Community Service and Utility Areas

Given the broad human use areas above, the design of each area may also be analyzed through the inventory process. The following are components which may characterize each of the areas. The identification and mapping of these components would be essential if detailed analysis of a site or area is desired.

Site components include:

Natural Features

Areas which have been left in a relatively natural condition

Man-Made Features

Surface alterations
Topography (rolling, flat, areas of change, etc.)
Surface characteristics (material, texture, etc.)
Surface spaces and patterns (shapes, distances, etc.)

Drainage and water controls (culverts, waterways, etc.)
Plantings (trees, shrubs, etc.)
Buildings and structures
Site furnishings (benches, fireplaces, fences, etc.)
Communicative devices (signs, billboards, etc.)
Circulation facilities
    Streets and drives
    Parking spaces
    Pedestrian walkways and facilities
Services and utilities
    Utilities
        Electric power
        Communication
        Gas
        Water supply
        Sewage
    Fire controls
    Lighting
    Solid waste disposal
    Sound controls (buffers, etc.)
    Other

The following questions may be used to obtain overall ratings of various environmental use areas in the community. The ratings may be classified in terms of high, medium, and low. In such a system of evaluation, for example, residential areas may be rated and mapped according to how well they meet man's needs. Guidelines for assessing their effects on the natural environment were given in the preceeding part.

Evaluative Questions: (use where appropriate in evaluating a feature)

Physical Needs

Is the environmental feature or component functional and does it possess characteristics of:

1. convenience and efficiency,
2. safety and health,
3. durability or lastingness?

Psychological Needs

Is the environmental feature or component and its effects pleasurable to the senses, for example, is it aesthetically pleasing?

Social Needs

Does the environmental feature or component assist people to exist in harmony together, to interact, and to gain a measure of individual and group recognition?

Criteria to assist in answering the above evaluative questions may be derived by considering the following:

1. Existing and desired regulations and standards (safety standards, zoning requirements, etc.)

2. Existing and desired use objectives of the area or development (to provide for ease of movement, etc.)

3. Unique characteristics of the area or development (one of a kind, historic significance, etc.)

4. Characteristics of those using the area or development (age, health, etc.)

5. Principles of design (unity, harmony, balance, dominance, repetition, contrast)

V. RELATED SOCIAL, POLITICAL, AND ECONOMIC ASPECTS

The following data is useful in identifying and resolving existing environmental problems, in planning to avoid future problems, and in pursuing opportunities to enhance the existing environment. The information is specifically helpful in understanding the causes and effects of problems and in seeking avenues for resolving them.

Population Characteristics

- Current population
- Population trends
- Future population projections
- Seasonal population increases
- Population migration
- Age classes
- Education
- Residence
- Occupation
- Income

History of Resource Use

- Early cultures
- Pioneer settlers to the present

Current Land Ownership

- Community lot plan
- Public and private ownership

Economic Land Values

- General land area values
  (describe basis for determining)

Local Governmental Structure

- Governmental organization chart
- Local environmental management agencies and offices
- Names and addresses of governmental officials

Major Ordinances and Plans

- Zoning ordinances
- Subdivision ordinances
- Other

Private Organizations and Resource People

External Resources and Influences

- Social - Private organizations
- Governmental - Public agencies
- Economic - Business and industry

VI. SOURCES OF INVENTORY INFORMATION

GENERAL REFERENCES

1. Resource Conservation and Development Project Plans

   Mr. John C. Malley
   Project Coordinator
   Resource Conservation and Development Project Office
   151 Forest Avenue
   Portland, Maine 04101

   Mr. Snyder Von Day
   Project Coordinator
   St. John - Aroostook Resource Conservation and Development Project
   P.O. Box 109
   Presque Isle, Maine 04769

2. Regional Planning Commission Plan

3. Local Planning Board Community Master Plan

4. Aerial photograph:

   Cartographic Division
   Soil Conservation Service
   Federal Center Building
   Hyattsville, Maryland 20782

   See also local Soil Conservation Service Office

5. Local community officials:

   Selectmen or Councilmen
   Town manager
   Town engineer
   Town planning board members
   Town conservation commission members
   Other officials

6. Local Chamber of Commerce
   (community publicity brochures and other information)

7. Town reports

8. Maine Highway Atlas

   State Highway Commission
   Augusta, Maine 04330

9. County Extension Office

10. Maine Department of Economic Development
State Office Building
Augusta, Maine 04330

Information folders
Maine Community Betterment Program

11. Environmental Improvement Commission
State House
Augusta, Maine 04330

May have information on specific environmental problem areas

12. Natural Resources Council of Maine
20 Willow Street
Augusta, Maine 04330

Information on environmental problem areas

13. Maine Municipal Association
Executive Secretary
89 Water Street
Hallowell, Maine

Information clearinghouse

14. Maine Conservation Directory

Merrymeeting Audubon Society
Box 255
Brunswick, Maine 04011

15. Maine Register, State Yearbook and Legislative Manual
Published by Fred L. Tower Companies
Portland, Maine

Governmental and economic information related to the state and communities

16. McHarg, Ian L., Design with Nature. Garden City, New York: The Natural History Press, 1969.

17. Edward C. Jordan Company, Inc., 379 Congress Street, Portland, Maine 04101.

Environmental planning and engineering services

SPECIAL REFERENCES

Natural Environmental Features and Characteristics

LAND

1. U.S. Geological Survey
Washington, D.C. 20242

Information on topography, topographic maps and descriptive folders

2. Maine Geological Survey
Augusta, Maine 04330

Preliminary geologic map of Maine

3. Soil Conservation Service and local Soil and Water Conservation Districts
4. Local County Office

Soils maps
Soil suitability maps and related soil data

5. The Soils of Maine (Rourke and Hardesty) Misc publication No. 676, May 1966, University of Maine

WATER

1. U.S. Geological Survey
Washington, D.C.

Evaluation of groundwater potential currently underway

2. Department of Inland Fisheries and Game
State Office Building
Augusta, Maine 04330

Lake surveys
Information on water quality, rivers and streams, wetlands

3. Park and Recreation Commission
State Office Building
Augusta, Maine 04330

Coastal planning, river studies, etc.

4. State Planning Office
189 State Street
Augusta, Maine 04330

Water resources planning

5. Department of Sea and Shore Fisheries
State House
Augusta, Maine 04330

Marine and estuary pollution monitoring, research
Publications

6. Wetlands Control Board
Department of Sea and Shore Fisheries
State House
Augusta, Maine 04330

Administers protection of coastal wetlands

7. Water Resources Center
South Campus
University of Maine
Bangor, Maine 04401

Conducting a water inventory, information services and research coordination

8. Local water district

9. Local lake association

10. Local river valley conservation association

11. Cultural Eutrophication of Maine Lakes. Sept., 1970, Water Resources Center, 213 Auburn Hall, South Campus Bangor, Maine 04401

ATMOSPHERE AND CLIMATE

1. Weather Bureau Office
151 Forest Avenue
Portland, Maine 04101

General information concerning weather and climate

PLANT AND ANIMAL ASSOCIATIONS

1. Forestry Department
Augusta, Maine 04330

2. Department of Inland Fisheries and Game
State Office Building
Augusta, Maine 04330

General information available

3. Department of Sea and Shore Fisheries
State House
Augusta, Maine 04330

General information available

4. Cooperative Wildlife Research Unit
   240 Forest Resources Building
   University of Maine
   Orono, Maine 04473

5. Maine Audubon Society
   57 Baxter Boulevard
   Portland, Maine 04101

   General information on wildlife and associated problems

6. Bureau of Sport Fisheries and Wildlife
   Division of Wildlife Services
   State Supervisor
   Box 800
   Room 212, Federal Building
   Augusta, Maine 04330

   General information on many wildlife aspects

7. University of Maine
   Cooperative Extension Service
   Orono, Maine 04473

8. County Extension Office

9. Local district forestry and game biologist

10. Local tree warden

Man-Made Environmental Features and Characteristics

AQUACULTURE AND COMMERCIAL FISHERIES

Department of Sea and Shore Fisheries
State House
Augusta, Maine 04330

AGRICULTURE

1. County Soil and Water Conservation District

2. Department of Agriculture
   State Office Building
   Augusta, Maine 04330

FORESTRY

1. Forestry Department
   Augusta, Maine 04330

2. American Forest Institute
   New England Regional Office
   Lester A. DeCoster
   RFD #1
   Etna, Maine 04434

   Sponsors tree farm programs

3. White Mountains National Forest
   Headquarters
   Bethel, Maine 04217

4. Local district forester

OIL AND NATURAL GAS

Maine Petroleum Association
283 Water Street
Augusta, Maine 04330

Information on Maine oil industry

MINERAL MINING

Maine Geological Survey
Augusta, Maine 04330

ENERGY PRODUCTION

1. Central Maine Power Company
   9 Green Street
   Augusta, Maine 04330

2. Bangor Hydro-Electric Company
   Bangor, Maine 04401

INDUSTRIAL MANUFACTURING

1. Department of Economic Development
   State Office Building
   Augusta, Maine 04330

2. Maine Department of Labor and Industry
   Augusta, Maine 04330

   Census of Maine Manufacturers

COMMERCIAL AREAS

Local Chamber of Commerce

INSTITUTIONAL AREAS

Local governmental officials

RESIDENTIAL AREAS

1. Local realtors
2. Local planning board
3. Department of Health & Welfare
   Division of Sanitary Engineering
   Augusta, Maine 04330

   Land use for houses and trailers

HISTORICAL AREAS

1. Local historical society
2. Local library

OPEN SPACE AREAS

Local Conservation Commission

TRANSPORTATION-CIRCULATION AREAS

1. Local governmental officials
2. Maine State Highway Commission
   State Office Building
   Augusta, Maine 04330

RECREATIONAL AREAS

1. Local recreation department

2. Park and Recreation Commission
State Office Building
Augusta, Maine 04330

SERVICE AND ENVIRONMENTAL CONTROL AREAS

1. Public Utilities Commission
State House
Augusta, Maine 04330

Public drinking supplies, power lines, etc.

2. Department of Health and Welfare
Division of Sanitary Engineering
Augusta, Maine 04330

Concerned with radiation, sewage, solid waste, public and private drinking supplies, land use for houses and trailers

3. Environmental Improvement Commission
State House
Augusta, Maine 04330

4. Board of Pesticide Control
State Office Building
Augusta, Maine 04330

Regulates use and/or sale of pesticides in state of Maine

Related Social, Political, and Economic Aspects

POPULATION

1. State Planning Office
189 State Street
Augusta, Maine 04330

2. Public Affairs Research Center
Bowdoin College
Brunswick, Maine 04011

3. Bureau of Census
Boston, Massachusetts

4. Maine Employment Security Commission
Augusta, Maine 04330

HISTORY OF RESOURCE USE

1. Local historical society
2. Local library

CURRENT LAND OWNERSHIP

Local tax office

ECONOMIC LAND VALUES

Local tax office

LOCAL GOVERNMENTAL STRUCTURE

Local town officials

LOCAL ORDINANCES AND PLANS

Local town officials